

Numerological symbols in Schoenberg's creation

Mădălina RUCSANDA¹, Alexandra BELIBOU²

Abstract: *Expressionism in music was the movement that brought the contrast to previous eras promoting a tense music, exacerbation of means of expression and destruction of tonal balance. The works that belong to this innovative artistic movement involve diverse interpretations, because they capture the general tense atmosphere, from an aesthetic-philosophical perspective, highlighting some text-sonority correspondences and the expressiveness of the elements of musical language. Over time, various connections have been made between music and mathematics, proving that mathematics can give a solid, deep foundation to music, without having a major impact on the rendering of feelings. This research presents some aspects of how numerology influenced and marked the creation of the expressionist composer Arnold Schoenberg. By using the symbolism of numbers, we can better understand the way the composer thought and created his music, strongly marked by the dissolution of tonality, the twelve-tone technique, and the transition from belcanto to "Sprechgesang" and "Sprechmelodie".*

Key-words: *numerology, Expressionism, twelve-tone technique, atonalism*

1. Introduction

In the 20th century, due to the social realities of the time, the foundations of important artistic and cultural currents that changed the perception of art were laid: Fauvism, Cubism, Expressionism, Dadaism, Surrealism, Pop Art, or Optical Art, Minimalism and last but not least Postmodernism. In music, different solutions were sought to innovate the sound material by: neo-tonal processing of the circle of tonalities (Hindemith, Scriabin even Schoenberg), the appearance of scales based on the hexatonic principle (Debussy), the use of polytonality and poly-modalism, atonality, twelve-tone technique or even integral serialism (Schoenberg-Berg-Webern).

¹ Transilvania University of Braşov, m_rucsanda@unitbv.ro

² Transilvania University of Braşov, alexandra.belibou@unitbv.ro

The movement that brings the contrast compared to the previous eras, promoting a tense music and the exacerbation of the means of expression and also the destruction of the tonal balance is Expressionism. Expressionism will mean at the same time abstraction (as an impoverishment or overcoming of the concrete, in the language point of view) but also a permanent waste of such intensity, that will result in the remaining of only instinctual emotions or on the contrary, a permanent abstraction of emotions, a rationalization until their emotional substance is lost (Bulancea 2004, 153-169). Wanting to reproduce the feeling of fear of the tormented man and the protest against society, the Expressionist artist prefers to relate to themes from the periphery of social and psychological life, related to pathological eroticism, crime or sadism, expressing exacerbated moods or even ones considered sick.

Expressionists use harsh means of musical expression, a violent and very varied rhythm, numerous polyrhythms and polymmetries, contorted songs with complex polyphonies and harsh timbre colors, with violent contrasts and capitalization of extreme registers. The melody, having large and unusual intervals, appears as a cantata fugue. The harmonic progression is in continuous motion and has exaggerated dissonances that annihilate the functional order, going as far as polytonalism and atonalism.

Expressionism will dominate Schönberg's compositional conception, who, together with his disciples A. Berg, A. Webern, Ernst Krenek, Franz Schreker, will look for unusual means in the field of all elements of musical expression: melody, rhythm, harmony, dynamics, timbre, manifesting the tendency to deny the previous ways of organizing the musical language: syntactic symmetry, tonal unity, structural harmony. In terms of composition technique, new ways of expression appear, aiming at a broad tonalism, going towards atonalism, twelve-tone technique, the transition from belcanto to "*Sprechgesang*" and "*Sprechmelodie*", all these ways deriving from the natural evolution of music. So, the Expressionists will continue the process of dissolution of the tonality, will exaggerate the dynamic and agogic fluctuations, the rhythmic freedom and will predict the freedom of the forms. Music is close to mathematics, giving it a solid foundation of great depth, but, as Solomon Marcus stated, only mathematics alone is not able to explain everything in music.

In this paper, we will make some connections between numerological meanings and works from the creation of the expressionist composer Arnold Schoenberg.

2. Arnold Schoenberg- biography and works

Arnold Schoenberg (1874-1951) was one of the forerunners of Expressionism, although, under the influence of Brahms and Wagner, he began by composing completely tonal works. In the first period of composition (approximately between 1896 - 1908), he debuts with the vocal miniature genre, lied, justifying the tendency towards miniaturization as a consequence of the new style, freed from the tutelage and rigors of tonality (Varga 1983, 57). Thus, he composed mainly cycles of lieds with piano (op. 1, 2, 3, 6, 11, 12, 14) or with orchestra (op. 8, 1907), in which the melody of the voice expresses a lot of tension and which does not represent anything but an aspect of the search for new ways of writing music, but without being dissociated from those applied in other genres.

This is followed by an a cappella chorus (op. 13), two string quartets (op. 7 and op. 10), the second of which shows the process of "transcending" tonality. The novelty that this work brings is the appearance of the soprano voice in the last movements. Also, for this first period of creation we mention programmatic works characterized by dense polyphony and rich orchestration, but also with original colors of excessive chromatic movement and the tendency towards poly-thematic: the string sextet *Verklärte Nacht* (op. 4), the symphonic poem *Pelléas and Mélisande* (op. 5), with rich sounds and dense polyphonic processing, but also with new harmonic structures, made by overlapping fourths and the whole tone scale, sometimes reaching the twelve-tone scale. Other works worth mentioning are: the first Chamber Symphony (op. 9) for 15 solo instruments that consists of continuous variations, using fourth chords and hexatonic structures, and the String Quartet op. 7 in D minor (1905), a work in which he concentrates the four movements in one part and uses a dense counterpoint writing.

Between 1909-1914 the composer renounces to use tonality and replaces it with atonalism, gives up thematic work or formal construction in the traditionalist spirit, moving towards Expressionism through the abundance of chromatic melody and dissonances, through dense polyphony and conciseness of structures. The works of this period differ from those of the previous from a melodic point of view, but also harmonically and thematically: the choir *Friede auf Erden* op. 13 (Peace on Earth), Ballads op. 12, Lieds op. 14 and op. 15, Five pieces for orchestra op.16 (1909), but also the Quartet no. 2 op. 10 (the last two parts of which are sung). He also composed two Expressionist monodramas, *Erwartung* op. 17 and *The Hand of Fate* op.18 (1913).

In 1912 he finalized his atonal system creation process with the work *Pierrot Lunaire* op. 21, consisting of 21 vocal-instrumental miniatures for voice and five

instruments, over poems by Alfred Giraud and through Four lieds for voice and orchestra op. 22 (1914).

Starting with 1917, the first signs of twelve-tone technique and serial technique appear in his works, which, as the composer confessed, represent the composition of a music starting from the 12 sounds of the chromatic scale and ordered in series. Schoenberg's first work on this line was Five Pieces for Piano Opus 23 (1923), then Moses and Aaron and the Violin and Orchestra Concerto op.36, Piano Suite op. 25 (1924), The Wind Quintet op. 26 (1928), Two Pieces for Piano op. 33 (1932). In the Suite for Seven Instruments op. 29 (1926) and the third String Quartet op. 30 (1926) or in Variations for Orchestra op. 31 (1928) he renounces the atonal rigor, and in Chamber Symphony no. 2 op.38, he will try to make a synthesis between the atonal/ twelve tone language and the tonal one. He continues to keep the atonal language in his creation until the end of his life.

3. The relationship between music and mathematics

Numerologists are convinced that numbers are closely related and govern the universe, and the well-being of each depends on the consonance with the cosmic vibration. Since the time of Pythagoras, it has been observed that mathematics and music are inseparable, both being related to both the cosmos and the architecture of the human spirit. Pythagoras found that musical sound is the result of regular vibrations of elastic bodies and stated that there is geometry in the noise of strings and implicitly, there is music in the spacing of spheres.

The five types of regular polyhedrons highlighted by Plato are entities as fundamental as Euclid's line, circle, square, and sphere, and are part of Plato's vision of mathematics as a representation of the universe. We find them in myths, in different religions, in the symbolism of the arts and in the fundamental results of science.

For example, the symbolism of the number 3, considered a structural and fundamental element of the cosmos, differs depending on the origin of the myth. Thus, in Indian mythology, three layers-dense water, dense wind, and thin wind-separate this world from the outer world and in the Rig-Veda, a group of gods holds three heavens and three grounds. The goddess Hecata from Greek mythology has 3 faces and in the myths of the Baltic Slavs, the three heads of Triglav symbolize three kingdoms: heaven, earth, and the underworld. Unlike the dynamic nature of number 3, the number 4 appears in mythologies around the world as a static and stable structural element of the cosmos. The sum of these numbers is number 7, which is a magic number in many mythologies.

The prime number, the Fibonacci sequence, the golden ratio, the ordered set, the topological space, the Möbius strip, Klein's bottle, Dedekind-infinite set, and Robinson's nonstandard analysis summarize structures, prototypes and processes or behaviours of universal value.

Over time, many connections have been made between music and mathematics, culminating in the simultaneous emergence of Einstein's theory of relativity and Arnold Schoenberg's twelve-tone music. Schoenberg's twelve-tone system is the climax of a twenty-five-hundred-year quest to subjugate music to mathematical rules — and this time it came from an insider, a composer. (Adamenko 1965, 136).

But mathematics alone is not able to explain everything in music. Music will never be written exclusively with the help of mathematical symbolism, but music can be treated through mathematics, giving it a solid foundation of great depth. In support of this idea, one can use music software to make orchestrations or even musical compositions. Starting from the mathematical properties of the music structure, the researchers built complex computational algorithms, obtaining computer programs that transform music into kaleidoscopic images or geometric structures in continuous motion.

4. Numerological symbols in Schoenberg's creation

We can state that numerology influenced the expressionist composer. His fear of the number 13 is known, which followed him all his life (he was born and he died on a day of 13th, he died at the age of $67 - 6 + 7 = 13$). For Schoenberg, numerology inspiration resulted from an eclectic combination of Jewish and Christian numerological traditions: Schoenberg combined the traditional with the idiosyncratic, to the point that his individual mythmaking contradicts established numerological symbolism (Ringer 1976, 80-95).

In Schoenberg's works, numerology has an important role in the pitch organization. A first aspect worth mentioning is the twelve-tone system (or dodecaphony) - a method springing from atonalism, to which is linked the principle of non-repeatability and the emancipation of dissonance - a condition for composing melody, harmony, polyphony, which deals with ways of organizing the 12-sound series in dissonant relationships, called rows. Schoenberg's tone row is a strictly determined compositional formula that replaces the musical theme and is organized both internally, and in progress, according to the non-repetition principle: the same sound cannot reappear until the others have been used, the order of appearance is to be chosen by the composer. The row can undergo 3

transformations: inversion (denoted I), retrograde (R), or retrograde-inversion (RI), in addition to its “original” or prime form (P).

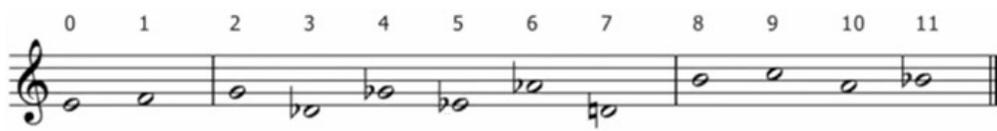


Fig. 1. Tone row in prime form – “Suite for Piano, op.25”

Numerology is found in Schoenberg's piano works. Thus, the chronological study indicates that the works with op. numbers 12, 13 and 14 were composed before op. 11. Number 11, considered “*master number which all those who practice numerology approach with awe*” (Sterne 1993, 12) has been preserved for the 3 pieces, whose musical language is completely atonal. Probably the choice of opus number for his first work dedicated to the piano, influenced the rest of the compositions for the same instrument, the total amount of pieces being equal to 111.

Pierrot Lunaire was composed in Schoenberg's second period of creation, after the composer had discovered atonalism, but before developing his twelve-tone technique. The inner psychological focus of the text and the strange combination of atonality and sprechstimme mark it as a clearly expressionist work. Sterne makes an analogy between the work Pierrot Lunaire (21 melodramas for female voice with instrumental accompaniment) and numerology, demonstrating how numerology simultaneously defines several parameters of music. According to Sterne's description, Schoenberg limits the variety of numerical relations to only five numbers, which influence different parameters of his work. This is comparable to some archaic mythical systems that limit the elements of the cosmos to just five fundamental numbers. These represented the combination of 1 (center of the world) and 4 (points of a compass).

In Pierrot Lunaire the title indicates the importance of the numbers 3 and 7 and implicitly, their product 21, in which the sum of the digits is 3. The opus number of the work is 21, representing the reversal of the last 2 digits of 1912, the year in which the work was composed: “*Five numbers, 3, 7, 1, 11, and 22, governed the format of the work [Pierrot lunaire], its time span, pitches and intervals, timbre, and instructions to the performer. [...] Even more importantly, the five-number set controlled [...] not only all the rest of Schoenberg's atonal music, but, beginning with his Opus 1, his tonal music, and, amazingly enough, even his twelve-tone compositions. [...] Even the texts Schoenberg wrote himself were controlled by the same small group of five numbers with seven digits*” (Sterne 1993, vi and 4.)

Starting from the book of Genesis according to which God creates the world in six days, in mythology the number 6 is considered to be a perfect number. „Schoenberg used the number 6 for his hexachordal row of the unfinished *Modern Psalm* (1950) and in the "sixfold six-tone pattern" in the opening of *Die Jakobsleiter* (Ringer 1982, 87-94.).

In the unfinished opera *Moses und Aron* (1923-1937), built in twelve-tone technique, Schoenberg emphasizes the role of Aaron as the one chosen to interpret the Word of God (as revealed to Moses), in a way accessible to ordinary people. Kenneth Marcus states that this work and *Die Jakobsleiter* embody the composer's desire to experience the unity and understanding of God (Marcus, 2016, 44). It is noteworthy that the texts on Jewish themes were written at a time when anti-Semitism was on the rise, and the fundamental topics covered by the composer were Jews in exile, seeking a means of returning to their homeland and communicating with God through law and prayer. In this direction, the following words belonging to Schoenberg complete the spiritual picture engraved by the musical-religious creations: "I offer my artistic sacrifice to the Jewish cause. I bring this offering with enthusiasm, because nothing is above me, like my people. " (André 2000, 10).

The whole opera is based on the standard 48 transformations of a single source row: A, Bb, E, D, Eb, C#, G, F, F#, G#, B, C. Characteristic is that the row possesses hexachordal inversional combinatoriality, in other words, there is an inversion that exchanges the unordered content of the first six notes with that of the last six.



Fig. 2. Tone row in prime form and its combinatorial inversion in "Moses und Aron"

"*De profundis*" (Op. 50B) - 1950 - is the only work written exclusively in Hebrew, at the invitation of Chemjo Vinaver, a well-known singer and choir conductor from New York. In *De profundis* we identify a series of numerological symbols inserted by the composer. One of them is the total number of bars contained in the work - 55 -

number that is reduced to the value 1, a figure with a special meaning, allusion to the dual nature of matter and spirit, of God and man. Also, the number one is equivalent to the center, with the still point. Plotinus equates this number with moral purposes, and multiplicity with evil - a symbolic distinction in accordance with the dual principle we support (Cirlot 2001, 244). In addition to this allusive element, researchers have observed the presence of two interval dyads used allegorically (Klontz 2015; Couvillon 2002; Sterne 1993). These strengthen the strong dual character of the psalm used as a textual support by Schoenberg, the Old Testament text being a transition from individual prayer to hope in collective salvation.

The two interval dyads are contrasting structures, which are subject to the human-divine antinomy. From an analytical point of view the tone row can be synthesized by the coexistence of two intervals: major third and tritone. Thus, the twelve-tone row itself, sectioned in two hexachords, has a dual essence - consonant interval next to a dissonant interval.



Fig. 3. *Tone row in prime form – “De profundis”*

The connection between these intervals is not accidental, because going further with the row analysis, we find that in each hexachord, the dissonant interval can be resolved at any of the accompanying consonant intervals. So, the elements of the series are not individual entities, but exist in dependence. This idea insinuates a tonal gravitational character of the row.

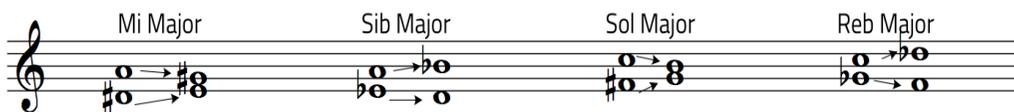


Fig. 4. *Tonal resolutions of the tritones in the tone row – “De profundis”*

The interval dyads, which we mentioned above, were called by researchers Divine Dyad – the major third and AS Dyad - Arnold Schoenberg's dyad - tritone. The two contrasting interval constructions complement each other in the musical discourse. The divine dyad corresponds to the word Adonai - a name used by the Jews for God. There are also uses of this dyad on other words, which in the textual context

receive sacred values. Arnold Schoenberg's dyad comes from the initials of the composer's name - A S, which in musical transcription means nothing more than a tritone – *a – ees*. The interval cells that we talked about are the smallest units that ensure the uniformity of the sound material of the entire piece of music.

The AS dyad (or human interval) appears in various forms, depending on the form of the tone row. Thus, when we talk about the primary form, the tritone range includes the sounds *a* and *ees*; in R0 form - *ees* and *a*; in form I3 - *ges* and *c*; in form RI3 - *c* and *ges*. In the case of the divine interval, it is presented as the dyad *f - des* (P0), *des - f* (R0), *e- gis* (I3) and *gis - a* (RI3). If we examine the interval associations of dyads with the text, we notice that the human interval is used as a personal, human voice, while the divine dyad establishes the name of God and His entire contribution in the process of redeeming humanity.

Another symbolic connotation that we want to comment on is that of the number 3, which defines the divine dyad and is found prominently in the Coda section, in the form of layering of voices. The choir sings the news of salvation in dialogue in pairs of three voices. Also, at a simple glance at the score, we notice numerous rhythmic groups of three elements: dactyl, anapest, triplets, counter-timed formula in a row of sixteen notes. Sterne (1993) notes that the number 3 signifies, for Schoenberg, the work of art, the creative impulse, but also the sky, the supreme Creativity, to which the composer submits.

5. Conclusions

Numerous connections can be made between numerology and the works of the expressionist composer. We support the idea that music can be treated through mathematics, which gives it a solid foundation of great depth, but it is not enough to restore the richness of feelings. Arnold Schoenberg left little tangible evidence to confirm his belief in the occult power of numbers, but we can see connections throughout his works.

The works that analyse the creation from this perspective bring detailed information, supported by musical examples. We draw attention to the fact that by using the symbolism of numbers, we can better understand the way the composer thought of his music, because implicitly in Schoenberg's use of numerological manipulations, however, was his desire to lend personal meaning to his music through extra –musical devices (Clinton 1989, 13).

References

- Adamenko, Victoria. 1965. *Neo-Mythologism in Music from Scriabin and Schoenberg to Schnittke and Crumb*. New York: Pendragon Press Hillsdale.
- André, Naomi. 2000. "Returning to a Homeland, Religion and Political Context in Schoenberg's Dreimal tausend Jahre." In *Political and Religious Ideas in the Works of Arnold Schoenberg*, ed. by Charlotte Marie Cross, Russell A. Berman, 231-58. New York: Garland Publishing.
- Balancea, Gabriel. 2004. "Aesthetics of the Viennese school". In *Annals of the "Dunărea de Jos" University*, Issue XVIII(4), Philosophy, year II: 153-169.
- Cirlot, Jean Eduardo. 2001. *A Dictionary of Symbols*. London: Routledge.
- Clinton, Mark Kennerly. 1989. *Historical and Theoretical Perspectives of Arnold Schoenberg's "Drei Klavierstuecke," Opus 11*. Houston: Rice University.
- Couvillon, Thomas. 2002. *Text and structure in Schoenberg's Op. 50, and an original composition, Symphony #1*. Louisiana State University.
- Klontz, Mary-Hannah. 2015. *The Heart and Mind of Arnold Schoenberg's "De profundis" Op. 50B*. Vancouver: George Mason University Fairfax.
- Marcus, Kenneth. 2016. *Schoenberg and Hollywood Modernism*. Cambridge University Press.
- Ringer, Alexander L. 1982. "Faith and Symbol: On Schoenberg's Last Musical Utterance." *Journal of the Arnold Schoenberg Institute* 6: 87-94.
- Ringer, Alexander L. 1976. "Arnold Schoenberg and the Prophetic Image in Music". In *Journal of Arnold Schoenberg Institute* 1: 80-95.
- Sterne, Colin. 1993. *Arnold Schoenberg: The Composer as Numerologist*. New York: Mellen Press.
- Varga, Ovidiu. 1983. *Qvo vadis musica? The three Viennese and Orpheus' nostalgia*. Bucharest: Music Publishing House.